

FREQUENCY MEASURING DEVICE, POLISHING DEVICE
USING THE SAME AND EDDY CURRENT SENSOR

ABSTRACT OF THE DISCLOSURE

Disclosed is a frequency measuring device capable of
5 accurately detecting an end point of polishing a
semiconductor wafer by obtaining a frequency measurement
result highly accurately in a short period of time. A
device FC for measuring the frequency of a measured signal.
Vin comprises a counting section including a number i ($i \geq 2$)
10 of n -nary counters $1 - i$, a time reference circuit 13 which
outputs a time reference signal T , whose duration is t ,
every time interval p , and a number I of gate circuits $G1$
to Gi whose outputs are connected to the inputs of the
 n -nary counters $1 - i$. The gate circuits receive the
15 measured signal Vin at a first input and receive the time
reference signal T at time intervals p at a second input.
With this structure, the counting section supplies the
frequency measured result of the measured signal Vin every
time interval p .

20 Further, the present invention provides an eddy
current sensor capable of stable operation is provided for
accurately detecting a polishing end point. The eddy
current sensor detects the thickness of a conductive film
from a change in an eddy current loss generated in the
25 conductive film. The eddy current sensor comprises a
sensor coil for generating an eddy current in the
conductive film, and an active element unit connected to
the sensor coil for oscillating a variable frequency
corresponding to the eddy current loss. The sensor coil
30 and active element unit are integrated to form the eddy
current sensor. Alternatively, the eddy current sensor
comprises a sensor coil for generating an eddy current in
the conductive film, and a detector for detecting a change
in the thickness of the conductive film from a change in a
35 resistance component (R) in an impedance formed by the
sensor coil and conductive film.